IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	James Roger Samworth
Serial Number:	10/661,851
Filed:	September 12, 2003
For:	METHOD OF LOGGING A BOREHOLE
Art Unit:	2884
Examiner:	Djura Malevic
Atty doc:	128-03

AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is a response to a non-final Office Action dated October 18, 2005, to which response was due by January 18, 2006. Applicant requests a two-month extension of time to respond pursuant to 37 CFR 1.136. The requisite fee is attached pursuant to 37 CFR 1.17. Kindly amend the above-identified, patent application as follows:

Discussion of the Technology and the Invention:

A neutron logging tool operates by irradiating a formation with neutrons. In the formation neutron capture occurs, with resulting emission of gamma radiation. Broadly, therefore, it is possible to assess the neutron capture either by recording the extent of neutron decay following irradiation by a burst; or by detecting the quantity of gamma radiation generated as a result of the neutron capture.

Two effects contribute to the neutron decay. The first is a general dissipation that would occur as the neutrons diffuse away from the source even if the neutrons did not encounter the formation in which capture occurs. The other is the conversion of neutrons as a result of the capture phenomenon.

When the neutrons irradiate a formation, the latter effect (conversion of neutrons) predominates such that neutron decay may be related to the extent of capture in the formation. It is believed possible, moreover, to correct for the more generalized decay such that the neutron decay signal generated by the detector may be treated as a reasonable measure of capture in the formation.

Logging the neutron decay with a neutron detector itself does not produce a current output that is indicative of gamma radiation detection. Rather, the output of the neutron detector is indicative of neutron decay according to the foregoing principles.

The gamma detector output which may be used as an alternative is a consequence of the neutron capture in the formation. Clearly this type of detection results in a current output that is indicative of gamma radiation detection. Each detection approach requires a specific detector (i.e., either a neutron detector or a gamma detector, as appropriate). The data are associated with particular characteristics that differ as between the neutron and gamma detection types. Each type of detection, however, is a valid way of obtaining a signal that is indicative of the extent of neutron capture in the formation.

One feature that is common the two approaches to formation capture assessment is the notion that the data are not a measure of the neutron burst *per se*. Thus when considering the neutron capture technique, one measures neutron decay; and when one adopts the gamma approach, one measures the amount of gamma radiation that results from the neutron capture. However, neither of these signals is an indicator of the size of the burst.